



Disaster and Emergency Management Resources

Floods and Flash Floods

Except for fire, floods are the most common and widespread of all natural disasters (FEMA, 2003). Of all of the hazards facing West Virginia, floods constitute the greatest threat to property and lives. The Standard Flood Insurance Policy (SFIP) defines a flood as a “general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from overflow of inland or tidal waters, from unusual and rapid accumulation or runoff of surface waters from any source, or from mudflow.”

Most communities in the United States can experience some kind of flooding after spring rains, heavy thunderstorms, or winter snow thaws. Floods can be slow- or fast-rising but generally develop over a period of days. Flooding has caused the deaths of more than 10,000 people in the United States since 1900, and property damage from flooding totals more than \$1 billion each year.

Dam failures and flash floods can cause a very large amount of damage very suddenly. As mentioned earlier, West Virginia’s topography and development patterns make it particularly vulnerable to flash flooding. Flash floods usually result from intense storms dropping large amounts of rain within a brief period. Antecedent moisture, including both saturated or frozen soil conditions, can cause flash flooding from moderate rainfall events. Flash floods occur with little or no warning and can reach their peak in only a few minutes.

Flood – A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from overflow of inland or tidal waters, from unusual and rapid accumulation or runoff of surface waters from any source, or from mudflow.

Flash Flood – A flood event occurring with little or no warning, where water levels rise at an extremely fast rate.

Floodplain – Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.

Floodway – The channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the 1-percent-annual-chance flood without cumulatively increasing the water surface elevation by more than a designated height.

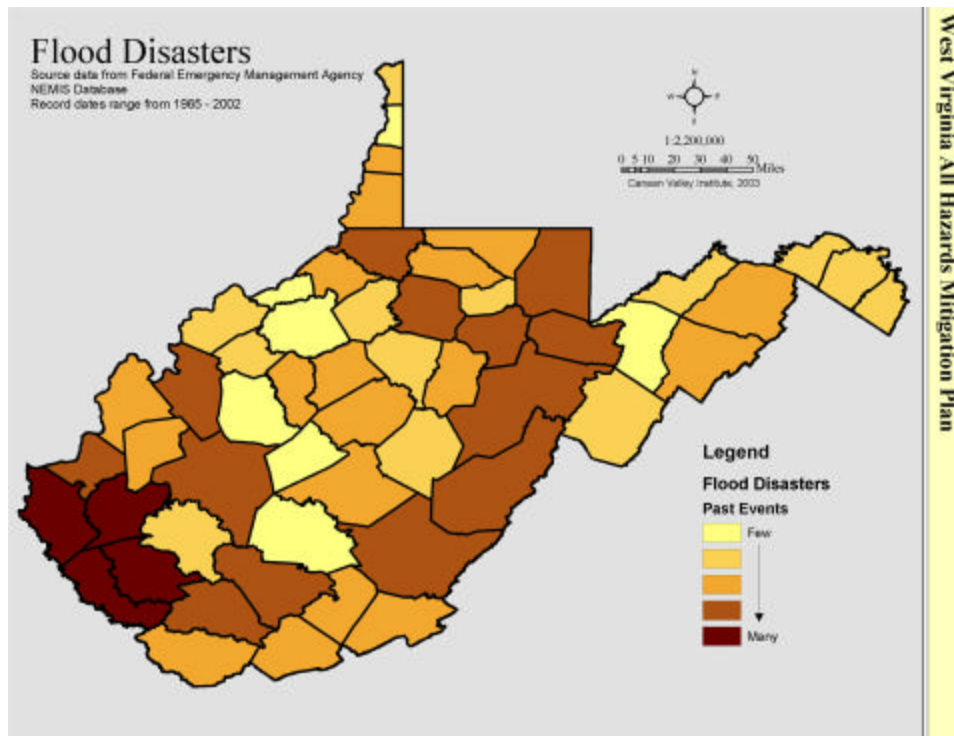


Figure 3.1A: West Virginia Flood History by County (1965-2002)

Throughout the history of West Virginia, floods have caused the death of hundreds of people and cost millions of dollars in property damage. Between 1960 and 1996, flooding in West Virginia killed 252 people, the third highest in the nation. The map of Flood Disasters (Figure 3.1A) shows the general trends of flooding frequency at the county level in West Virginia from 1965 to 2002. Four counties in the southwest Logan, Mingo, Wayne, and Lincoln have suffered the most flood disasters, although no county has had less than three federally declared flood disasters.

From 1996 to 2001, there have been eight federal disaster declarations statewide, requiring over \$290 million in assistance from FEMA. The map in Figure 3.1B shows a breakdown of historical spending by the state and federal governments in West Virginia from 1990 to 2003. Despite having fewer declared disasters, McDowell, Wyoming, and Fayette Counties required the highest amount of funding for flood recovery.

For The West Virginia Statewide Flood Protection Plan, the USACE developed the At-Risk Structures Identification. A combination of FEMA's Q3 and DFIRM floodplain data (available for 37 of the 55 counties in West Virginia) was overlaid onto Digital Ortho Quarter Quadrangles (DOQQ's). Individual structures were identified and classified by use-categories (residential, commercial, and institutional) within the FEMA-designated 1 percent annual chance floodplain and the regulatory floodway. It should be noted that the floodplain includes the floodway. Residential, industrial, and commercial structures were identified utilizing criteria such as structure size, location, surrounding features, and best professional judgment. The institutional classification was made using the Geographic Names Information System (GNIS) and was obtained from the West Virginia Geographic Information System (GIS) Data Catalog.

For the remaining 18 counties without digital floodplain data, the Corps estimated the number of structures in the floodplain and floodway. Tables were developed that listed the geographic coordinates, use types, floodplain panel information, and numerous other data fields that will be of use in the future. The findings indicated that an estimated 110,321 structures are located in West Virginia's floodplains, and 11,032 are positioned in the floodway.

For this hazard mitigation plan, West Virginia's counties were ranked based on their overall risk from flooding using an index composed of the number of floodplain and floodway properties from the aforementioned study, and additional information from the NFIP on policies, claims, and repetitive losses through the year 2000. Table 3.1B contains the results of this analysis.

Table 3.1B: County Ranking Based on Flood Risk

Rank	County	Score		Rank	County	Score
1	KANAWHA	44		8	WOOD	12
2	MCDOWELL	29		8	LINCOLN	12
3	LOGAN	25		9	HARRISON	11
4	WYOMING	24		10	MERCER	8
4	OHIO	24		11	WAYNE	7
5	MINGO	15		12	FAYETTE	5
6	GREENBRIER	14		13	TUCKER	4
7	RALEIGH	13		13	RANDOLPH	4
7	CABELL	13		13	POCAHONTAS	4
				14	WETZEL	1

Two hundred sixty-seven communities in the state are participating in the NFIP. In these communities, 19,789 policies are in force. Assuming the policies cover only structures in the floodplain, this number of policies represents about 18 percent of the total floodplain structure inventory. The owners of the remaining uninsured structures have no financial protection against losses from flooding.

Currently the NFIP offers \$1.5 billion in coverage to West Virginia residents, who are paying \$9.8 million in premiums. Table 3.1C provides a breakdown of each county's participation in the NFIP program. The table presents the following data:

- FP Structures – the number of structures located in the county's floodplain (unadjusted values from the USACE study cited above),
- FW Structures – the number of structures located in the county's floodway (unadjusted values from the USACE study cited above),
- Rep. Losses – the number of properties designated as Repetitive Loss Properties within the county,
- Premium \$ - the total cost of insurance premiums for flood insurance within the county,
- Policies # - the total number of NFIP policies within the county,
- Coverage\$ - the total coverage amount for the county,
- Claim # - the total number of NFIP claims filed in 2002,
- Claim \$ - the total amount requested in NFIP claims filed in 2002, and

- Avg. Claim \$ - the average amount of an NFIP claim filed in 2002 for that county.

Note that West Virginia has had 17,995 claims totaling \$179,097,506. Refer to Table 3.4.3A in the Loss Estimates section for details on repetitive losses in West Virginia.

In addition, information about floods in West Virginia is limited. Flood mapping around the state is insufficient, outdated, or not detailed enough to effectively assess the flood risk. Statistical information on past flood damages to specific parcels is not easily accessible to necessary agencies. There is a significant lack of geographic information to accurately locate floodplains and floodways. Even warnings of impending floods are unreliable for providing adequate time to prepare.

Only recently has West Virginia begun to establish data sources to combat the threat of flooding. Steps are being actively taken at local and state levels to reduce the overall risk of catastrophic flooding. As a result, flood mitigation has become a high priority for the state.

Table 3.1C: NFIP Participation by West Virginia Counties

County	FP Structures	FW Structures	Rep. Losses	Premium \$	Policies #	Coverage \$	Claims #	Claim \$	Avg. Claim \$
BARBOUR	685		3	\$118,330	187	\$14,047,000	351	\$3,410,026	9,715.17
BERKELEY			2	\$86,871	187	\$17,219,000	343	\$5,021,218	14,639.12
BOONE			38	\$285,434	581	\$35,375,000	335	\$1,480,629	4,419.79
BRAXTON	1124		12	\$15,402	44	\$2,817,000	32	\$248,393	7,762.28
BROOKE	955	8		\$199,325	404	\$24,453,000	298	\$1,645,820	5,522.89
CABELL	3405	163	10	\$391,055	753	\$68,517,000	449	\$3,200,555	7,128.18
CALHOUN	673		9	\$55,670	127	\$5,047,000	236	\$1,703,439	7,217.96
CLAY	1252	7	10	\$31,144	63	\$5,518,000	17	\$78,769	4,633.47
DODDRIDGE	2		1	\$20,964	61	\$3,234,000	44	\$239,348	5,439.73
FAYETTE	43	80	88	\$131,758	336	\$21,158,000	157	\$1,224,067	7,796.61
GILMER	867		11	\$107,078	178	\$13,623,000	315	\$3,314,713	10,522.90
GRANT	522		5	\$83,965	133	\$17,175,000	151	\$2,999,501	19,864.25
GREENBRIER	2739	322	22	\$389,596	662	\$47,384,000	497	\$9,969,420	20,059.20
HAMPSHIRE	1820			\$78,506	182	\$11,860,000	290	\$4,996,661	17,229.87
HANCOCK	115	28		\$103,320	137	\$18,119,000	92	\$614,408	6,678.35
HARDY	1083		23	\$120,752	175	\$21,042,000	192	\$3,608,489	18,794.21
HARRISON	1655	187	30	\$162,514	375	\$22,006,000	647	\$4,461,791	6,896.12
JACKSON	2023	20	17	\$140,619	297	\$26,442,000	206	\$2,389,384	11,598.95
JEFFERSON				\$118,307	165	\$21,134,000	141	\$2,292,948	16,262.04
KANAWHA	9458	1707	119	\$1,312,351	2,639	\$218,941,000	962	\$7,884,140	8,195.57
LEWIS	895	27		\$72,034	180	\$9,411,000	280	\$1,659,096	5,925.34
LINCOLN	2701	371	38	\$81,937	193	\$12,277,000	154	\$884,230	5,741.75
LOGAN	5194		5	\$449,597	914	\$66,766,000	1,602	\$12,731,010	7,946.95
MARION	2			\$121,364	261	\$19,360,000	232	\$1,106,789	4,770.64
MARSHALL	1762	40		\$165,901	323	\$22,860,000	293	\$893,190	3,048.43
MASON	1384	77	21	\$67,668	169	\$11,255,000	147	\$704,110	4,789.86
MCDOWELL	4005		176	\$349,606	880	\$48,965,000	899	\$6,553,432	7,289.69
MERCER	2664	6	122	\$271,728	458	\$47,770,000	302	\$2,622,059	8,682.31
MINERAL			38	\$106,170	244	\$17,740,000	170	\$1,388,571	8,168.06
MINGO	3603	26		\$212,322	493	\$43,447,000	1,323	\$22,190,316	16,772.73
MONONGALIA			4	\$170,373	260	\$31,046,000	274	\$1,862,053	6,795.81
MONROE	853	19		\$17,220	41	\$2,163,000	16	\$187,369	11,710.56
MORGAN			7	\$85,682	147	\$13,816,000	178	\$2,701,257	15,175.60
NICHOLAS	2		20	\$94,022	178	\$13,774,000	68	\$463,309	6,813.37
OHIO	2761	136	3	\$719,267	1,294	\$78,668,000	1,671	\$7,178,040	4,295.66
PENDLETON			28	\$38,042	98	\$5,729,000	71	\$367,159	5,171.25
PLEASANTS	1			\$35,396	78	\$4,648,000	37	\$309,621	8,368.14
POCAHONTAS	5		20	\$262,109	430	\$32,900,000	608	\$13,502,037	22,207.30
PRESTON			1	\$70,927	134	\$11,264,000	95	\$1,100,998	11,589.45
PUTNAM	1901	33	5	\$178,570	443	\$52,536,000	105	\$570,506	5,433.39
RALEIGH	3649		96	\$230,715	470	\$35,007,000	235	\$1,584,992	6,744.65
RANDOLPH	1749	38	49	\$128,360	340	\$21,921,000	487	\$4,434,126	9,104.98
RITCHIE			8	\$28,987	74	\$3,501,000	57	\$314,524	5,517.96
ROANE	1040	7	31	\$47,359	114	\$9,330,000	90	\$658,241	7,313.79
SUMMERS	779		3	\$82,202	214	\$11,957,000	316	\$4,932,009	15,607.62
TAYLOR	1			\$16,997	42	\$2,618,000	33	\$94,737	2,870.82
TUCKER	537	177	7	\$220,365	244	\$38,481,000	367	\$7,106,533	19,363.85
TYLER	731	6	20	\$39,334	107	\$4,876,000	42	\$167,915	3,997.98
UPSHUR	1335		2	\$172,235	363	\$24,256,000	364	\$2,462,982	6,766.43
WAYNE	2686	220	24	\$173,298	363	\$29,329,000	283	\$1,910,369	6,750.42
WEBSTER	4			\$69,430	199	\$10,981,000	125	\$626,397	5,011.18
WETZEL	1824	92	3	\$208,984	430	\$25,699,000	182	\$781,399	4,293.40
WIRT	717		11	\$30,580	81	\$3,468,000	70	\$497,280	7,104.00
WOOD	2517	181	2	\$402,780	680	\$70,670,000	534	\$5,008,381	9,378.99
WYOMING	3331		323	\$479,147	1,164	\$65,036,000	530	\$8,758,750	16,525.94
Total	77054	3978	1467	\$9,853,669	19,789	\$1,518,636,000	17,995	\$179,097,506	9,952.00

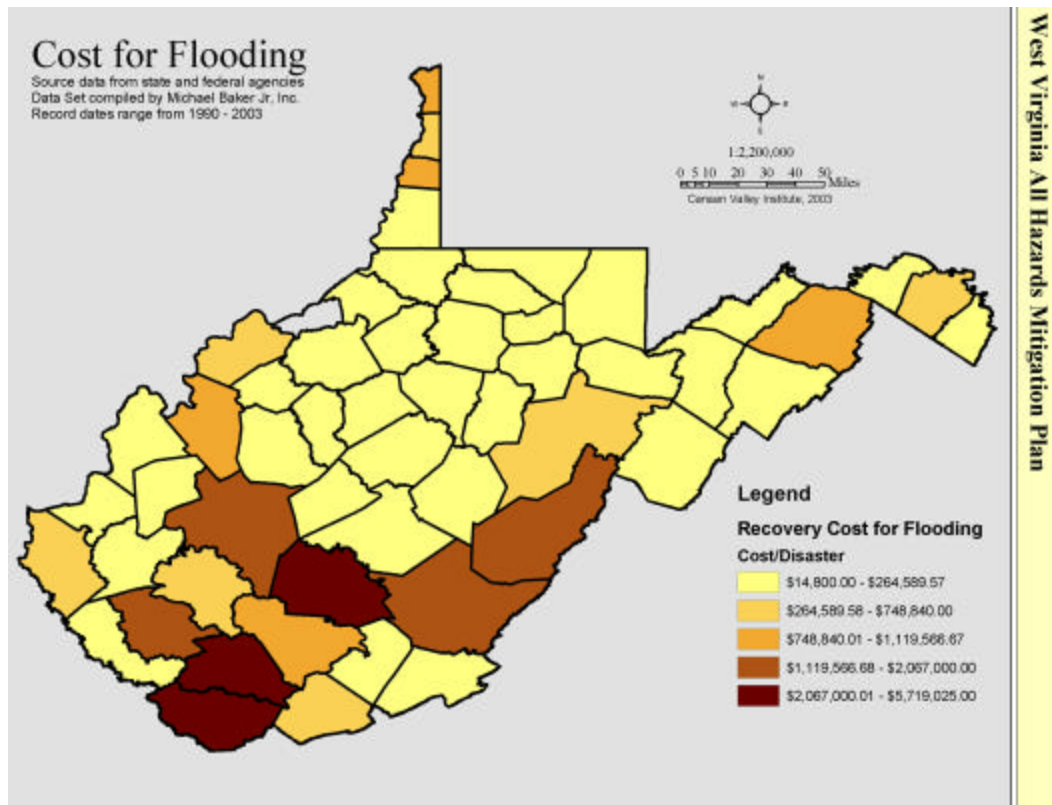


Figure 3.1B: Map of Recovery Cost of Flooding by County

From the West Virginia All Hazard Mitigation Plan, West Virginia Office of Emergency Services

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